Applicant : Thomas M. Cronin
Serial No. : 09/878,051
Filed : June 7, 2001
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Attorney Docket No.: 10559-478001
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REMARKS

Claims 1 to 30 are in the application. Claims 1, 11 and 21 are independent. Favorable reconsideration and further examination are respectfully requested.

In the Office Action, claims 1 to 30 were rejected under 35 U.S.C. §103 over U.S. Patent No. 5,838,813 (Kancler) in view of U.S. Patent No. 4,460,924 (Lippel). As shown above, Applicant has amended the claims to define the invention with greater clarity. In view of these amendments, withdrawal of the art rejection is respectfully requested.

The invention is directed to using a dither pattern to render a three-dimensional model defined by volumetric three-dimensional data. As is generally known to those of skill in the art, ordinary three-dimensional data represents the "skin", or outer shell, of a model using polygons. By contrast, volumetric three-dimensional data defines a characteristic of a volume, including its interior. For example, as described in the specification, volumetric three-dimensional data may be used to define densities in a cloud. This invention represents such a three-dimensional model using a dither pattern. The character of the dither pattern is based on a characteristic (e.g., density) of the model.

Thus, as defined by amended independent claim 1, the invention is directed to a method of rendering a three-dimensional model comprised of volumetric three-dimensional data. The method includes obtaining a characteristic of the three-dimensional model, determining a three-dimensional dither pattern based on the characteristic, the three-dimensional dither pattern comprising points in a volumetric region, and rendering a dithered version of the three-dimensional model using the three-dimensional dither pattern.

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The applied art is not understood to disclose or to suggest the foregoing features of claim 1. In particular, the art is not understood to disclose or to suggest at least determining a three-dimensional dither pattern based on a characteristic of a three-dimensional model, where the three-dimensional dither pattern comprises points in a volumetric region, and rendering a dithered version of the three-dimensional model using the three-dimensional dither pattern.

In this regard, Kancler describes a method of reconstructing a two-dimensional image that uses a dithering technique. In particular, the Kancler technique represents portions of an image acquired by different sensors as three-dimensional graphs (see, e.g., column 7, lines 10 et seq.). However, Kancler does disclose or suggest rendering a three-dimensional image using a three-dimensional dither pattern, much less rendering a three-dimensional image comprised of volumetric data using a three-dimensional dither pattern comprised of points in a volumetric region. This was noted on page 2 of the Office Action ("Kancler does not explicitly teach the model and the dither pattern are 'three dimensions' as claimed"). Lippel was cited to make up for this deficiency of Kancler.

Lippel describes modifying a television signal using a dither pattern. In particular, during raster scanning, a dither signal is scanned across a display at a rapid speed, thereby approximating a two-dimensional dither pattern. Lippel mentions use of a three-dimensional dither patter in this context (see, e.g., columns 1 and 2 of Lippel). However, the three-dimensional dither pattern referred to in Lippel does not relate to a three-dimensional model, but rather to changing a two-dimensional dither pattern between successive frames of a televised moving picture (see column 2, lines 40 to 42 of Lippel).

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Thus, even if Lippel were combined with Kancler in the manner suggested in the Office Action, the resulting hypothetical combination would still fail to disclose or to suggest at least determining a three-dimensional dither pattern based on a characteristic of a three-dimensional model, where the three-dimensional dither pattern comprises points in a volumetric region, and rendering a dithered version of the three-dimensional model using the three-dimensional dither pattern. Accordingly, claim 1 is believed to be allowable.

Amended independent claim 11 is an article of manufacture claim that roughly corresponds to claim 1; and amended independent claim 21 is an apparatus claim that roughly corresponds to claim 1. These claims are believed to be allowable for at least the same reasons noted above with respect to claim 1.

In view of the foregoing amendments and remarks, the entire application is believed to be in condition for allowance, and such action is respectfully requested at the Examiner's earliest convenience.

No fees are believed to be due for this Amendment; however, if any fees are due, please apply them to Deposit Account No. 06-1050.

Applicant's undersigned attorney can be reached at the address shown below.

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Telephone calls regarding this application should be directed to the undersigned at 617-

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Respectfully submitted,

Date: September 25, 2003

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